

CLAIMS

30 A1  
1. A method for heat treating a barium titanate-based particulate composition comprising:  
heating a barium titanate-based particulate composition at a temperature between about  
5 700 °C and about 1150 °C to form a heat-treated particulate composition.

2. The method of claim 1, comprising heating the barium titanate-based particulate composition at a temperature between about 900 °C and about 1100 °C.

10 3. ~~The method of claim 1, wherein the barium titanate-based particulate composition is formed by a hydrothermal process.~~

15 4. The method of claim 1, wherein the barium titanate-based particulate composition has an average particle size of less than about 0.25 micron prior to heating.

5. The method of claim 1, wherein the heat-treated composition has an average particle size of at least 25% greater than the average particle size of the barium titanate-based particulate composition.

20 6. The method of claim 5, wherein the heat-treated composition has an average particle size of at least 100% greater than the average particle size of the barium titanate-based particulate composition.

25 7. The method of claim 6, wherein the heat-treated composition has an average particle size of at least 200% greater than the average particle size of the barium titanate-based particulate composition.

8. The method of claim 1, wherein the heat-treated composition has an average particle size of between about 0.2 micron and about 1.0 micron.

9. The method of claim 1, wherein the heat-treated particulate composition has essentially the same composition as the barium titanate-based composition.

10. The method of claim 1, wherein the barium titanate-based particle composition  
5 comprises substantially spherical particles before the heating step.

11. The method of claim 1, wherein the heat-treated composition comprises substantially spherical particles after the heating step.

10 12. The method of claim 1, wherein the barium titanate-based particulate composition is heated for a time period of at least one hour.

11 13. The method of claim 1, further comprising depositing at least one dopant coating layer on surfaces of particles of the barium titanate-based composition.

15 14. The method of claim 13, further comprising adjusting the A/B ratio of the heat-treated composition.

16 15. The method of claim 14, comprising adjusting the A/B ratio of the heat-treated composition by depositing a coating comprising a barium compound on surfaces of particles of the heat-treated composition.

16. The method of claim 1, further comprising sintering the heat-treated composition.

25 17. The method of claim 16, comprising sintering the heat-treated composition at a temperature between about 1150 °C and about 1400 °C.

18. The method of claim 1, further comprising forming a dielectric layer from the heat-treated composition.

19. A method for heat treating a barium titanate-based particulate composition comprising:  
heating a barium titanate-based particulate composition at a temperature and for a time  
sufficient to cause particle growth and insufficient to cause particle sintering thereby forming a  
heat-treated particulate composition.

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20. The method of claim 19, comprising heating the barium titanate-based particulate  
composition at a temperature and for a time sufficient to cause particle growth to a selected  
average particle size.

21. The method of claim 20, comprising heating the barium titanate-based particulate  
composition at a temperature and for a time sufficient to cause the average particle size of the  
barium titanate-based particulate composition to increase by at least 25%.

22. The method of claim 20, comprising heating the barium titanate-based particulate  
composition at a temperature and for a time sufficient to cause the average particle size of the  
barium titanate-based particulate composition to increase by at least 100%.

23. ~~The method of claim 19, wherein the barium titanate-based particulate composition is  
formed in a hydrothermal process.~~

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24. The method of claim 19, further comprising depositing at least one dopant coating layer  
on surfaces of particles of the heat-treated composition.

25. ~~The method of claim 19, further comprising adjusting the A/B ratio of the heat-treated  
composition.~~

26. The method of claim 25, comprising adjusting the A/B ratio of the barium titanate-based  
composition by depositing a coating comprising a barium compound on surfaces of particles of  
the heat-treated composition.

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28. The method of claim 27, comprising sintering the heat-treated composition at a temperature between about 1150 °C and about 1400 °C.

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30. The method of claim 19, wherein the heat-treated particulate composition has essentially the same composition as the barium titanate-based composition.

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